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pairs of guardian cells, but they are not all in the same horizontal plane, one pair, the "subsidiary cells," of Strasburger being below the other. The guardian cells are usually ornamented by silicified ridges radiating from the orifice, not a trace of which can be found in the fossil under discussion.

Some of the Bryophytes, notably the liverworts, have stomata with more than two guardian cells, but they are loosely cellular plants quite unlike this hollow-stemmed plant.

In the absence of more specific information as to its affinities, I have decided to describe this plant under a tentative name, recognizing the fact that this provisional name may be changed at any time provided the fossil can be more definitely placed. I had at first given it the name of *Hillia*, but as there is a genus of this name in Rubiaceae, I have called it *Paleohillia*. It commemorates the collector and is not intended to imply relationship with the Rubiaceous genus.

### Observations upon some Oklahoma Plants.

BY EDGAR W. OLIVE.

The botany of Oklahoma is exceedingly interesting, because this territory is a borderland region between the Gray's Manual and Western Texas Manual regions. Until about five years ago, the plants of this district were but little known to botanists, and the results of recent collections disclose a flora rich in interesting forms. Especially valuable is a "List of Plants collected by C. S. Sheldon and M. A. Carleton in the Indian Territory in 1891," published as a contribution from the National Herbarium in 1892.

The months of July and August, 1893, were spent in and about Payne county, in the very northeast of Oklahoma, about 90 miles south of the Kansas line through the Cherokee strip, and about 150 miles west of Arkansas. This is in lat. 97° W. and is but a few miles south of the parallel bounding on the north Tennessee and North Carolina, so that the collections were made just south

of the line of the extreme southwestern limit of Gray's Man. 6th Ed. About 175 species of Phanerogams and Pteridophytes were collected, about 60 of them new to Messrs. Sheldon and Carleton's list, most of these, however, the commoner plants, and 12 of which are not reported in Gray's Manual. Of these 12, 3 are not included in Dr. Coulter's Manual of the Texas Flora, nor 8 of them in his Botany of the Rocky Mountain region.

These 12 plants are *Talinum calycinum* Engelm., found abundantly on the red sandstone rocks outcropping in ravines and along the Cimarron River; *Desmanthus Jamesii* T. & G., very abundant on dry prairies; *Galactia mollis* Michx., in sand along the river banks; *Acacia filiculoides* (Cav.) Trel., abundant in the sandy woods; *Gaura villosa* Torr., showing gradations into forms; *Sesuvium Portulacastrum* L., in sand along the saline banks of the river; *Cynosciadium pinnatum* DC., but one plant collected by a roadside; *Aster patens* Ait., var. *gracilis* Hook., the variety not in Gray's Manual, very abundant in rich sandy ground near the river; *Baccharis glutinosa* Pers., the fertile plant conspicuous by its very long and white pappus along the sandy river banks; *Eriogonum longifolium* Nutt., on dry prairies; *Aphanostephus ramosissimus* DC., found in abundance in the sand of rich river bottoms; *Cooperia Drummondii* Herb., near Stillwater on rich prairies.

The flora of Oklahoma is very similar to that of southern Kansas. The climatic and geologic conditions are very similar in both regions, and this fact, combined with the fact of the proximity of the Cimarron and Arkansas rivers flowing southward through the territory from Kansas, tends to make the floras alike. Outcropping "red-beds" (whence probably the name *Oklahoma*—"home of the red earth") occur in both regions associated generally with a very sandy soil. Rich, sandy land, well timbered, occurs along the rivers and creeks, while back some distance on the uplands, prairies supplant the forests. The farther west one goes, the observer can readily notice the dwarfing of the trees as the regions of less rainfall are passed through, and many plants show gradation into dwarfed forms. Most of the plants of this whole district, moreover, present the characteristics of the plants of dry sterile regions, viz., thickened leaves and epidermis, sunken sto-

mata, absence or narrowness of leaves, or an unusual amount of wooliness or hairiness.

There are quite a number of common oaks in some portions of this eastern part, Spanish oak, Post oak, but most abundant in the upland reduced forests is *Quercus nigra* L., the dwarfed, gnarled "black jack." There are some hickories, black walnuts, cottonwoods, and elms along the river and creeks, the elms bearing abundantly large bunches of mistletoe.

A few observations as to the occurrence and habitat of some plants may be interesting. In the rich sandy land along the river bottoms the commonest shrubs are *Cephalanthus occidentalis* L., *Stillingia sylvatica* L., *Rhus copallina* L. On *Stillingia* was found an *Aecidium* which has not been yet reported on this host, as far as can be determined. Somewhat abundant in similar places were *Argemone platyceras* Link and Otto, *Callirhoe involucrata* (Nutt.) A. Gray, *Parosela enneandra* (Nutt.) Britton, *Froelichia Floridana* (Nutt.) Moq., *Indigofera leptosepala* Nutt., *Aphanostephus ramosissimus* DC. In wet, salty sand near the river were *Pluchea camphorata* (L.) DC., *Sesuvium Portulacastrum* L., and in the dry sand, *Cycloloma atriplicifolium* (Spreng.) Coulter, *Baccharis glutinosa* Pers., and *Parosela lanata* (Spreng.) Britton. The latter is reported in Gray's Man. to have "3-4 pairs" of leaflets, while 6-7 pairs were usually present on the specimens collected. On the high bluffs of the river *Yucca glauca* Nutt. was not infrequent.

In the woods which extend back from the river bottoms two or three miles are *Cassia Chamaecrista* L., *C. nictitans* L., or "sensitive plant," *Desmanthus Jamesii* T. & G., *Clitoria Mariana* L., *Gaura villosa* Torr., *Onagra biennis* (L.), Scop., *grandiflora* Lindl., a beautiful passion-flower, *Passiflora incarnata* L., *Lacinaria squarrosa* (L.) Hill, *Chrysopsis villosa* Nutt., in many of its variable forms, *Asclepias verticillata* L., and *Acerates angustifolia* (Nutt.) Dec.; also low shrubs of *Bumelia lanuginosa* (Mx.) Pers. and several species of plum. A perhaps noteworthy point was the occurrence of *Ludwigia alternifolia* L. in sandy but perfectly dry ravines. Gray's Manual reports the habitat of this as "swamps."

The whole prairie region is characterized by an abundance of plants belonging to the orders Leguminosae and Compositae. Particularly abundant on the prairies are *Kuhnistera multiflora* (Nutt.)

Heller, *K. purpurea* (Vent.) MacM., *Amorpha canescens* Pursh, *Parosela aurea* (Nutt.) Britt., *Solidago Missouriensis* Nutt., *Helianthus mollis* Lam., *Hieracium longipilum* Torr. The fact is significant that of the 175 species collected, 33 were Leguminosae and 32 were Compositae. *Sabbatia angularis* (L.) Pursh, *S. campestris* Nutt. and *Buechnera Americana* L. give bright colors to the prairies during June and July; *Linum sulcatum* Riddell, *Ceanothus Americanus* L., *Jatropha stimulosa* Michx., *Euphorbia corollata* L., *E. petaloidea* Eng., *E. marginata* Pursh, occur on the richer prairies, while *Megapterium Missouriensis* (Sims) Spach, *Houstonia angustifolia* Mx., *Stenosiphon linifolium* (Nutt.) Britton, *Opuntia polyacantha* Haw., and *Gerardia densiflora* Benth., are found on dry sterile prairies. A very severe case of poisoning was incurred from collecting *Euphorbia corollata*.

A very paradise for a collector of aquatic vegetation is a large pond near Perkins, Oklahoma. Several *Sagittarias*, *Nelumbo lutea* Pers., *Potamogeton louchites* Tuckerm., the latter growing "rarely in ponds" (Gray's Man.), *P. diversifolius* Raf., are most abundant throughout, while near the edges *Heteranthera limosa* (Sw.) Willd., *Ludwigia glandulosa* Walt., *Monniera rotundifolia* Mx., and *Marsilia vestita* Hook. & Grev. grow rank. Some of the specimens of this *Marsilia* growing both in and along the banks of the pond have petioles 7-8' long, the type being reported in the Manuals 1-4'. Dr. Underwood, however, pronounces this undoubtedly *M. vestita*.

As suggested above, the special interest of this region lies in the fact of the meeting of two floras and the sometimes abrupt, generally gradual, transition of one into the other. The flora cannot be studied comprehensively except by an extended period of field work and by carefully noting all the environmental conditions. The farther west one goes into the territory the more sandy and desert the regions become; and such are the variations from some of the more eastern forms that many are classed as varieties, no doubt the result of a change in habitat. According to Mr. Coville's suggestions in his "Botany of Death Valley Expedition," the shrubs and trees and on the prairies the perennials should especially be noted to determine the characteristic plants of the flora.

Grateful acknowledgments are due to Dr. John M. Coulter and Professor E. B. Uline for kindly determining some of the species and checking most of the list of collections.

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### On the two Editions of Emory's Report, 1848.

For some time past I have been aware of the fact that there were two editions of Lieut. W. H. Emory's "Notes of a Military Reconnaissance," both bearing the same date (1848); but I supposed they were identical, except that one had appended to it the reports of Abert and Cooke and the journal of Johnston. But I now possess copies of both of these books, and find that they differ in various details, which are of importance on account of Prof. Torrey's reports on the botany of the expedition.

Both editions are Executive Documents of the 30th Congress, 1st session, and they are numbered 7 and 41, respectively. No. 7 was issued for the Senate. It contains nothing but Emory's report, with its seven appendices, and consists of 416 pages. Each page has [v] in the upper external corner. No. 41 was issued for the House. It contains the reports of Emory, Abert and Cooke, and Johnston's journal, and consists of 614 pages. "Ex. Doc. No. 41," appears in the middle of the top of each page, with the exception of pp. 145-158, in the botanical portion, which have [7] in the upper external corner. This is evidently a typographical error, and not a mistake in binding, for the pages are not the same as pp. 145-158 in No. 7.

In both of these volumes Professor Torrey's report on Emory's plants occupies pp. 135-159, constituting Appendix No. 2. My copy of No. 41 bears the following manuscript note at the top of page 135. "This appendix is full of gross typographical errors—the printer having refused to send me proof sheets according to agreement. J. Torrey." The same remark would apply with equal force to No. 7. Both books show evidence that they were published either carelessly or in very great haste. The principal differences between the two documents in the botanical portions are as follows: